

CLAIMS

What is claimed is:

- [c1] 1. An apparatus for directing laser energy to a plurality of targets in multiple fields of view, and receiving the scattered returns therefrom, comprising:
- a plurality of condensing optical elements for collecting said scattered returns,
  - a plurality of windows for allowing said laser energy to pass therethrough;
  - an optical enclosure being formed from a combination of said condensing optical elements and said windows;
  - a multiple-axis scanning mirror positioned to receive a laser beam, said multiple-axis scanning mirror directing said laser beam into one or more predetermined scan patterns; and
  - a fold mirror with patterned aperture positioned to intercept the laser scan pattern, from said scanning mirror, said fold mirror directing a first portion of said laser scan pattern along a first field of view and a second portion of said laser scan pattern along a second field of view.
- [c2] 2. The apparatus in accordance with claim 1 wherein said multiple-axis scanning mirror is located within said optical enclosure and receives said laser beam through an aperture in said optical enclosure.
- [c3] 3. The apparatus in accordance with claim 1 wherein said fold mirror further comprises:
- a transmissive central region passing said first portion of said laser scan pattern therethrough; and
  - a periphery deflecting said second portion of said laser scan pattern in a direction along said second field of view.

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- 1 [c4] 4. The apparatus in accordance with claim 1 further comprising a plurality of  
2 detectors, each detector converting said scattered returns collected from a  
3 respective condensing optical element into electrical signals.
- 1 [c5] 5. The apparatus of claim 1 wherein said condensing optical element is selected  
2 from the group consisting of imaging optical elements, non-imaging optical  
3 elements, reflective optical elements, refractive optical elements, diffractive optical  
4 elements, and holographic optical elements.
- 1 [c6] 6. The apparatus of claim 1 wherein said periphery includes a light directing  
2 element selected from the group consisting of reflective elements, refractive  
3 elements, diffractive elements, and holographic elements.
- 1 [c7] 7. The apparatus of claim 1 wherein said transmissive central region is selected  
2 from the group consisting of a physical hole, a holographic element, a partially-  
3 transparent refractive element, and a substantially-transparent refractive element.
- 1 [c8] 8. The apparatus of claim 1 wherein said fold mirror is tilted at a predetermined  
2 angle with respect to the laser energy from said scanning mirror.
- 1 [c9] 9. The apparatus of claim 8 wherein said fold mirror with patterned aperture  
2 comprises a plurality of holographic optical elements.
- [c10] 10. The apparatus of claim 8 wherein said fold mirror with patterned aperture  
comprises one or more electrically switchable holographic optical elements.
- 1 [c11] 11. A laser scanner for directing laser energy to a plurality of targets in multiple  
2 fields of view, and receiving the scattered returns therefrom, comprising:  
3 a plurality of condensing optical elements for collecting said scattered returns,  
4 a plurality of windows for allowing said laser energy to pass therethrough;

5 an optical enclosure being formed from a combination of said condensing  
6 optical elements and said windows;

7 a multiple-axis scanning mirror located external to said optical enclosure  
8 and positioned to receive a laser beam, said multiple-axis scanning mirror  
9 directing said laser beam through an aperture into said optical enclosure and  
10 forming a laser scan pattern therefrom;

11 a fold mirror with patterned aperture located within said optical enclosure  
12 and positioned to intercept the laser scan pattern, said fold mirror comprising,

13 a transmissive central region passing a first portion of said laser scan  
14 pattern therethrough in a direction substantially along a first field of view,  
15 and

16 a periphery deflecting a second portion of said laser scan pattern in a  
17 direction along a second field of view; and

18 a plurality of detectors, each detector located proximal to said optical  
19 enclosure to convert said scattered returns collected from a respective  
20 condensing optical element into electrical signals.

1 [c12] 12. The laser scanner of claim 11 further comprising beam expansion optics.